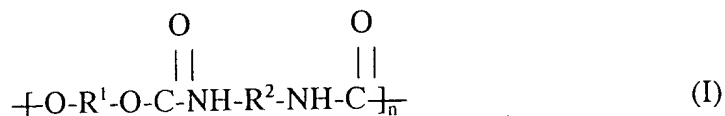


What is claimed is:

1. A composite structure with at least one polyurethane layer, a support layer, and an optional adhesive layer placed between these layers, wherein at least one polyurethane layer contains a polyurethane having the formula (I)



wherein O-R¹-O- is the radical of a polyole with primary and/or secondary hydroxyl functional end groups,

R¹ and R² independently represent an organic radical which includes aliphatic, cyclo-aliphatic, aromatic and/or heterocyclic groups, and
n is an integer number between 1 and 50,000.

2. The composite structure according to claim 1, wherein the at least one polyurethane layers comprises two polyurethane layers and wherein the outer and/or the inner polyurethane layer include a polyurethane of the formula (I).

3. The composite structure according to claim 2, wherein the polyole has a molecular weight from approximately 2000 to approximately 12,000.

4. The composite structure according to claim 1, wherein the polyole is a polyether glycol and/or a polyester glycol.

5. The composite structure according to claim 4, wherein the polyether glycol is a poly-(oxypropylene) glycol and the polyester glycol comprises glycols of dimeric fatty acids.

1 6. The composite structure according to claim 5, wherein the primary and
2 secondary hydroxyl functional groups of the polyole have a ratio of between approximately 2:1
3 and 1:6.

1 7. The composite structure according to claim 6, wherein the polyole is bi-
2 functional and/or tri-functional.

1 8. The composite structure according to claim 7, wherein the ratio of the bi-
2 functional polyoles to the tri-functional polyoles is between approximately 1:2 and approximately
3 5:1.

1 9. The composite structure according to claim 8, wherein in that the radical
2 R² is based on isophoron diisocyanate and/or hexamethylene diisocyanate.

1 10. The composite structure according to claim 8, wherein the radical R² is
2 based on diphenylmethane diisocyanate (MDI) and/or toluylene diisocyanate.

1 11. The composite structure according claim 10, wherein that the polyurethane
2 layer(s) which contain(s) the polyurethane according to formula (I), have/has a solid content of at
3 least approximately 95%.

1 12. The composite structure according to claim 11, wherein the polyurethane
2 layer(s) which contain(s) the polyurethane according to formula (I), have/has a thickness of
3 approximately 0.2 mm to 0.5 mm.

1 13. The composite structure according to claim 12, wherein the polyurethane
2 layer(s) which contain(s) the polyurethane according to formula (I), have/has a density of
3 approximately 0.3 g/ml to 0.8 g/ml.

1 14. The composite structure according to claim 13, wherein the polyurethane
2 layers which contain the polyurethane according to formula (I) have a content of volatile organic
3 chemicals (VOC) below approximately 100 ppm.

1 15. The composite structure according to claim 14, wherein the composite
2 structure has a grain.

1 16. A method of producing a composite structure comprising the steps of:

2 a) applying at least one polyurethane layer to a support having dehesive properties, forming
3 the at least one polyurethane layer by spreading onto a tape or onto a polyurethane coating, which
4 is preformed on the tape, a reactive spreadable material capable of forming a polyurethane and
5 having a composition (A) which includes

6 i) a polyole $\text{HO-R}^1\text{-OH}$ with primary and/or secondary terminal hydroxyl
7 functionalities,

8 ii) a diisocyanate $\text{OCN-R}^2\text{-NCO}$ and/or a diisocyanate pre-polymer
9 $\text{OCN-R}^2\text{-NH-CO-O-R}^1\text{-O-CO-NH-R}^2\text{-NCO}$, wherein R^1 and R^2
10 independently represent an organic radical which comprises aliphatic,
11 cyclo-aliphatic, aromatic and/or heterocyclic groups, and

12 iii) a catalyst,

13 and thermally hardening the spread compound;

14 b) applying an adhesive layer on the hardened polyurethane layer;

15 c) applying a textile support layer on the side facing away from the tape, and

16 d) removing the composite structure from the tape, after the adhesive layer has hardened.

1 17. The method according to claim 16, wherein the at least one polyurethane
2 layer is two polyurethane layers and wherein the outer and/or the inner polyurethane layer is
3 formed by using a reactive spreadable material having a composition (A) and being capable of
4 forming a polyurethane.

1 18. The method according to claim 17, wherein a metal acetyl acetonate is used
2 as a catalyst.

3 19. The method according to claim 17, wherein nickel acetyl acetonate is used
4 as a catalyst.

1 20. The method according to claim 16, further comprising the step of employing
2 a reactive spreadable material having the composition (A) and being capable of forming a
3 polyurethane, with the spreadable material having a viscosity in the range from approximately 1
4 Pa s to approximately 20 Pa s during spreading.

1 21. The method according to claim 20, wherein the time period during which
2 the viscosity of the reactive spreadable material having the composition (A) and being capable of
3 forming a polyurethane is in the range from approximately 1 Pa s to approximately 20 Pa s (open
4 time), is greater than approximately 6 hours.

1 22. The method according to claim 16, further comprising the step of employing
2 a reactive spreadable material having the composition (A) and being capable of forming a
3 polyurethane, with the spreadable material having structural-viscous properties.

1 23. The method according to claim 16, wherein the thermal hardening step is
2 carried out over a time period of approximately 0.1 to 4 minutes at approximately 100 to 180°C.

1 24. The method according to claim 23, wherein the thermal hardening step is
2 carried out over a time period of approximately 90 to 150 seconds at approximately 145 to 155°C.

1 25. The method according to claim 16, wherein a support with adhesive
2 characteristic properties is used, with the support having a negative of a desired grain.

1 26. An imitation leather manufactured according to the method of claim 16..

1 27. An expanded foil manufactured according to the method of claim 16.

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1 28. The composite structure according to claim 1, wherein the support layer is
2 a textile layer.

1 29. The composite structure according to claim 1, wherein the support layer is
2 made of PVC.

1 30. The composite structure according to claim 1, wherein the support layer is
2 made of polyolefine.

1 31. The composite structure according to claim 1, wherein the support layer is
2 made of polyurethane foam.